The protection of our environment is a core responsibility of DHEC. Ensuring that the impacts of our activities on the cleanliness of our air, the health of our waters, and the sustainable use of the land do not affect the health of our citizens has required regulation of the use of these resources. Violations of environmental standards not only degrade the environment, but can also result in increased risks associated with acute and chronic diseases. Environmental quality standards have been set to protect the most sensitive individuals and ecosystems. Protection of our citizens' health is essential, but allowing the degradation of our environment affects our quality of life, the perceptions of our communities, and can impact existing and future economic development. As we have met and gone beyond what is necessary to protect health, continued population growth, industry expansion and land use changes make it more important to understand the impacts and interrelations of many more dispersed contributions to pollution.

Watersheds define area of water body impacts

Watersheds are the land areas that deliver water, sediment and dissolved substances to a stream, lake or estuary. DHEC works to protect, restore and improve water quality by focusing our regulatory, monitoring and planning efforts on watersheds. All movement of water and physical, chemical and biological processes – including our activities within a watershed – affect the quantity and quality of water. Watersheds are significant because the water quality at any point in the system impacts the quality everywhere downstream.

Section 303(d) of the federal Clean Water Act requires South Carolina to compile a list every two years of the waters not meeting water quality standards. Portions of streams, rivers, lakes and other waterways are placed on this 303(d) list (or list of impaired waters) when five years of monitoring data indicate that state water quality standards are not being met.

http://www.scdhec.gov/eqc/water/pubs/303d2002.pdf.

S.C. Watersheds

Data Source: SC DHEC Bureau of Water

Waters may be listed as impaired for a variety of reasons, often the result of local and upstream land use. The impact of runoff from developed areas or agricultural uses can be significant. Water quality is checked for criteria such as dissolved oxygen, pH, potentially toxic pollutants, and bacteria. DHEC must develop a **Total Maximum Daily Load (TMDL)** for each lake, river or stream on the list. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive from all sources and still remain healthy and meet water quality standards. The Citizen's Guide to Clean Water is a good resource for those interested in the protection of their watershed.

http://www.scdhec.gov/water/pubs/citgd.pdf

Grants are available through DHEC for improvement projects. Contact a watershed manager for additional information.

http://www.scdhec.gov/water/shed/contact.html

Isolated wetlands need protection

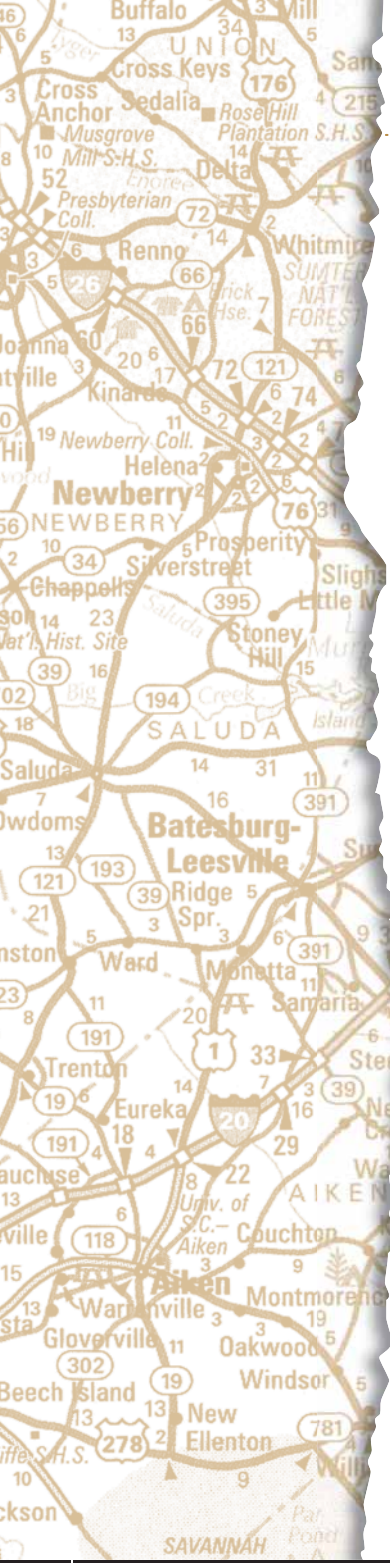
Wetlands are the most productive ecosystem on the North American continent. Freshwater wetlands are flooded or saturated by water from rain, surface runoff, stream flooding or seepage from groundwater. They help store water and reduce flooding and slowly release the water they hold, moderating flow and recharging nearby aquifers and underground streams. Wetlands also help purify water by processing nutrients, suspended materials, and other pollutants. They provide food and shelter to countless types of fish, birds, reptiles and mammals. Many endangered species depend directly or indirectly on the presence of healthy wetlands.

Isolated wetlands, those not connected to rivers or streams, are found throughout the state, but are most numerous in the central and lower areas of South Carolina. These rich areas include swamps, mountain bogs, sinkholes and our unique Carolina Bays. Isolated wetlands comprise at least 10 percent of the state's approximately 4 million acres of wetlands.

DHEC has historically regulated activities that altered wetlands in South Carolina through the Bureau of Water's Section 401 water quality certification and the Office of Ocean and Coastal Resource Management's coastal zone consistency certifications. A 2001 U.S. Supreme Court decision removed DHEC's opportunity to review activities in thousands of acres of isolated wetlands, making them vulnerable to development and destruction. DHEC has proposed a regulation to the General Assembly that would provide a permitting program to control and permit activities involving isolated wetlands.

State has rare opportunity to review power plant impacts

The Federal Energy Regulatory Commission issues licenses to operate hydroelectric projects for periods of 30 to 50 years. There are four major dam relicensing efforts currently under way involving or affecting South Carolina rivers. These are: the SCE&G facility on the Lower Saluda River, the Santee Cooper facilities on the Cooper and Santee rivers, the Duke Power facilities on the Catawba River, and the Progress Energy and Alcoa facilities on the Yadkin-Pee Dee River that flows into South Carolina from North Carolina. DHEC must certify that these facilities will not violate effluent limits and water quality standards. The license renewals are rare opportunities for DHEC to apply the latest data and employ the latest understanding of these river systems to ensure impacts on water quality are minimal.



Air quality a regional issue

Airflow through our state is not confined by well-defined boundaries. Local topography may affect a small area, but air quality at any point impacts the quality everywhere downwind. The control or elimination of local pollution sources, both from specific points like stacks and vents and from more numerous and dispersed sources like automobiles, can have the greatest local impact, but the contribution from activities "upstream" still can have an impact.

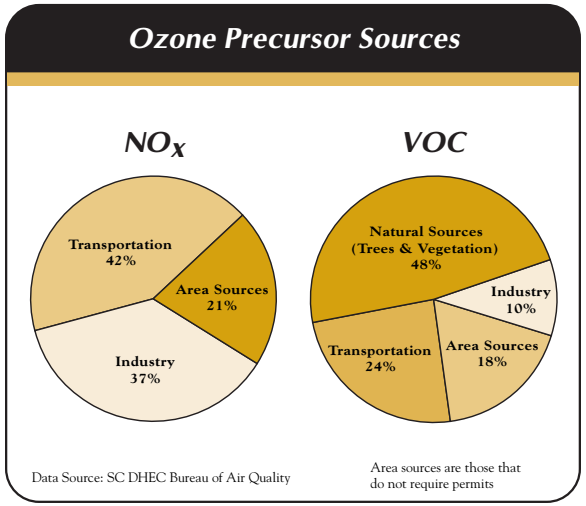
South Carolina has met all the ambient air quality standards for many years, and decreasing concentrations of lead, carbon monoxide, sulfur dioxide and nitrogen dioxide have mirrored the national trend. Concentrations of two pollutants, **ozone** and **fine particulate**, remain high enough to occasionally be a health concern.

On days forecast to have higher ozone concentrations, you can help reduce air pollution by:

- Driving less
- Carpooling
- Shopping by phone, mail or the Internet
- Riding public transit where available
- Combining your errands into one trip, "trip-chain"
- Telecommuting

Ground–level ozone and its precursors

Ground-level ozone is formed when two classes of chemicals, nitrogen oxides (NOx) and volatile organic compounds (VOCs), react in the presence of heat and sunlight. The largest source of NOx is the burning of fossil fuels. Our largest sources of VOCs are natural, but vapors from paints, glues and evaporating solvents contribute to the mix. The areas that contribute the most ozone precursors (the NOx and VOCs) and have the greatest impact to downwind ozone concentrations are the more densely populated urban areas with high levels of automobile traffic. Ground-level ozone typically approaches unhealthy concentrations only during the hot, summer months. Stagnant weather conditions keep pollutants close to the ground and prevent them from dispersing. Conditions that contribute to ozone formation also can increase concentrations of fine particulate.



8–hour ground–level ozone boundaries

National ambient air standards are set by the U.S. EPA to protect public health. In 1997, the U.S. EPA revised the national standard for ground-level ozone from a one-hour "peak" standard to an eight-hour "average" standard. This revised standard is commonly referred to as the 8-hour ozone standard. The more protective 8-hour standard is not being consistently met in the Greenville-Spartanburg-Anderson area and around Columbia.

In April 2004, the U.S. EPA designated three areas in South Carolina that do not meet, or "attain" the 8-hour ozone standard. A "nonattainment" designation requires specific air pollution control strategies to be put in place, dependent on the magnitude of the average high ozone concentrations above the standard.

Ground–level ozone forecasts protect sensitive groups

The most direct and effective measure that individuals with chronic respiratory and cardiovascular disease can take to protect themselves during those days when pollution concentrations may be a problem is to know when to reduce outside activity or stay inside. From May to September, when ozone levels can be a concern, a team of DHEC Bureau of Air Quality meteorologists reviews weather patterns, forecasts and pollutant concentrations to develop daily forecasts of the next day's ozone concentration and an Air Quality Index (AQI) for four regions of the state. Each afternoon, the meteorologists determine the projected concentrations for the next day and correlate that projection to the appropriate AQI color code. The Green, or "good," category (AQI 0 to 50) is the best air quality, followed by the Yellow, or "moderate" (AQI 51 to 100). **Ozone Action Days** are announced when Code Orange, or "unhealthy for sensitive groups," is predicted (AQI 101-150). An Ozone Action Day would also be declared if a Code Red, or "unhealthy" (AQI 151 to 200 or above), is predicted. The forecast is made available to media, individuals and organizations and is posted on the DHEC Web site.

http://www.scdhec.gov/eqc/baq/ozone/baqspare.asp

In December 2002, 45 of South Carolina's 46 counties joined with DHEC in a statewide ozone early action initiative to attain compliance with the 8-hour standard no later than December 2007. By participating in the **Early Action Compacts**, local areas can achieve cleaner air sooner and can design air pollution control strategies that are most appropriate for their areas. The designation for the Columbia area (parts of Richland and Lexington counties) and Anderson, Greenville and Spartanburg counties will be deferred as long as the areas continue to demonstrate progress through their Early Action Plans.

EPA also designated a portion of York County as nonattainment, even though the monitors in and around York County show that the air quality meets the ozone standard. The eastern portion of York County has been designated as a part of the Charlotte area and received that area's moderate classification. This portion of York County is no longer eligible to participate in the early action process.

http://www.scdhec.gov/eqc/baq/html/eap.html

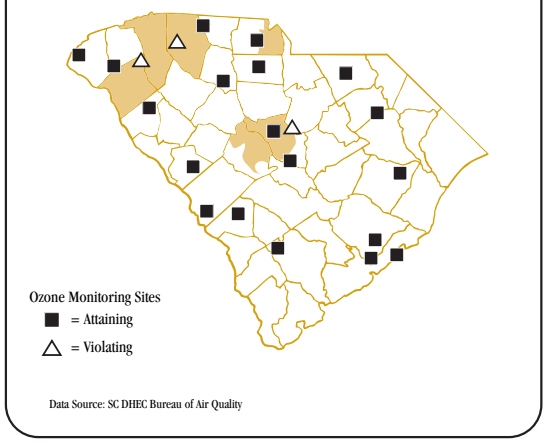
PM 2.5 designations expected this year

The designation of areas not meeting the **fine particulate** standard is also expected in 2004. DHEC has made boundary recommendations, with final determinations expected in December. Based on the latest three years of data, all areas, both urban and rural, are meeting the national particulate standards. As with 8-hour ozone concentrations, the inland and urban areas tend to have the higher concentrations. Columbia and the Greenville-Spartanburg area have had concentrations close enough to the standard to merit additional attention.

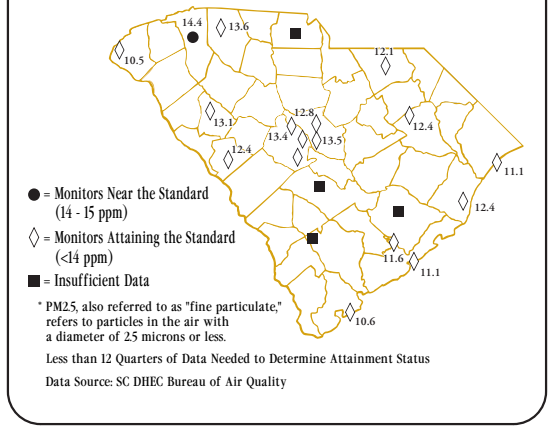
DHEC also is working with 10 Southeastern states to reduce the impacts of fine particulate on Class I areas, those areas identified by Congress to be protected from visibility impairment. The VISTAS (Visibility Improvement State and Tribal Association of the Southeast) effort is directed at reducing and improving visibility in these areas.

http://www.vistas-sesarm.org/

Areas Designated as "Nonattainment"



Average PM 2.5 Concentrations 2001-2003*



Ongoing challenges, new approaches

Petroleum brownfields targeted for cleanup

Human impact on land is not always as obvious as an open dump or abandoned mine. Automobile use has had an unseen impact below the surface, the result of failing buried gasoline storage tanks. Leaks from the tanks or from the pipes, pumps and dispensers that are attached to them have contaminated soils and groundwater across the state. DHEC's Underground Storage Tank (UST) Program ensures that contamination is located and cleaned up and the remaining tanks operated to reduce the chances of more leaks. The program also has increased efforts to identify and resolve environmental issues that hinder site redevelopment at abandoned gas stations and commercial sites. DHEC has asked local governments along with service and community organizations to help identify such sites in their neighborhoods. The UST Program then will assist in forming partnerships and coalitions to resolve the challenges involved in redeveloping these properties. The UST Program is administering two U.S. EPA grants for Petroleum Brownfields Projects in the cities of Anderson and Greenville.

- *Mark Berenbrok:* (803) 896-6848
- http://www.scdhec.gov/ust/

Additional resources:

U.S. Environmental Protection Agency
- http://www.epa.gov

Federal Energy Regulatory Commission
- http://www.ferc.gov

Association of State Wetlands Managers
- http://www.aswm.org/fwp/swancc